We claim:

1. A process for removing sulfur compounds from hydrocarbonaceous gases, which comprises using catalysts which exclude activated carbons and zeolites and comprise copper, silver, zinc, molybdenum, iron, cobalt, nickel or mixtures thereof at temperatures of from (–50) to 150°C and at a pressure of from 0.1 to 10 bar.

2. A process for removing sulfur compounds from hydrocarbonaceous gases as claimed in claim 1, wherein copper catalysts are used.

3. A process for removing sulfur compounds from hydrocarbonaceous gases as claimed in claim 1, wherein molybdenum catalysts are used.

4. A process for removing sulfur compounds from hydrocarbonaceous gases as claimed in claim 1, wherein copper catalysts and molybdenum catalysts are used together.

5. A process for removing sulfur compounds from hydrocarbonaceous gases as claimed in one of claims 1, 2, 3 or 4, wherein temperatures of from 0 to 80°C and a pressure of from 0.8 to 4.5 bar are employed.

6. The use of the process as claimed in one of claims 1, 2, 3, 4 or 5 for producing sulfur-free hydrocarbonaceous gases for preparing hydrogen.

7. The use of the process as claimed in one of claims 1, 2, 3, 4 or 5 for producing sulfur-free hydrocarbonaceous gases for preparing hydrogen for operating a fuel cell.

8. A catalyst which comprises from 1 to 99.8% by weight of copper, silver, zinc, molybdenum, iron, cobalt, nickel or mixtures thereof and from 0.2 to 99% by weight of oxides selected from groups IIB, IIIB, IVB, VIB, VIII, IIIA, and IVA of the Periodic Table of the Elements which are solids at least up to 250°C.

9. A catalyst as claimed in claim 8 for the use in a fuel cell system.

10. The use of the catalyst as claimed in claim 8 for removing sulfur compounds from hydrocarbonaceous gases.